REMARKS

Claims 2-11 and 13-24 are pending. Claims 2, 5, 6, 7, 8, 11, 13, and 21 have been amended, claims 14-20 are withdrawn from consideration and claims 22-24 are newly added. No new matter has been added by way of the present amendments. For example, claims 2, 5, 6, 7, 11, and 21 have been amended to recite the phrase "said nucleotide sequence comprising a nucleotide sequence of DNA which is amplifiable by polymerase chain reaction on a nucleic acid from a Gramineae plant with the primers represented by SEQ ID NO: 5 and 6" as supported by the present specification at page 10, lines 9-20 and Example 2. Claim 11 has also been amended to adopt claim language suggested by the Examiner to clarify the language relating to the absorption of iron using mugineic acid compound to solubilize the iron. Lastly, the subject matter of new claims 22-24 are supported by originally filed claim 3 taking into consideration the new SEQ ID NOs assigned when the Replacement Sequence Listing was filed. Accordingly, no new matter has been added.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Claim to Foreign Priority

At page 2 of the outstanding Office Action the Examiner asserts that in order to perfect the claim to foreign priority,

Applicant is requested to provide an English translation of JP 9-37499. Applicants traverse and submit that there is no requirement to provide an English translation of the Japanese priority document. The only time that an English translation might be required would be to overcome a reference having an effective date between February 21, 1997 and February 19, 1998. Since this is not an issue, Applicant submit that no English translation is necessary.

Issues Under 35 U.S.C. §112, second paragraph

The Examiner has rejected claims 2-11, 13 and 21 under 35 U.S.C. §112, second paragraph for the reasons recited at pages 4-5 of the outstanding Office Action. Applicants respectfully traverse each of these rejections.

First, the Examiner asserts that the phrase "encoding...and having nicotianamine aminotransferase activity" is indefinite. Applicants traverse and submit that the relevant claims have been amended to reflect that the amino acid sequence has the activity and not the nucleotide sequence.

Second, the Examiner has rejected claim 11 for reciting "iron making use of mugineic acid compound" and has suggested replacing this language with "iron using mugineic acid compound to solubilize the iron." Applicants have adopted this suggested claim language.

Third, the Examiner has rejected the phrase "the nucleic

acid sequence of nicotianamine aminotransferase" in claim 13 for lack of antecedent basis. Applicants submit that this phrase has been removed.

Accordingly, Applicants submit that each of the Examiner's rejections under 35 USC § 112, second paragraph has been overcome. Reconsideration and withdrawal thereof are requested.

Issues Under 35 U.S.C. §112, first paragraph

Written Description

The Examiner has rejected claims 2, 5-11, 13, and 21 under 35 U.S.C. §112, first paragraph asserting that the claims encompass subject matter which is not supported by the present specification. In particular, the Examiner continues to assert that the hybridization conditions have not been proven to be stringent.

Applicants respectfully traverse this rejection and submit that the specification provides sufficient information to conclude that Applicants were in possession of the nucleic acid genus comprising a nucleotide sequence recited in (b) of claims 2, 5-11, and 21. For instance, the specification describes structural attributes that are common to the members of the nucleic acid genus and that distinguish the nucleic acid genus.

The genus presently recited in the claims sets forth at least three common attributes, which include:

having nicotianamine aminotransferase activity;

an ability to hybridize to a specific nucleotide sequence, such as hybridizing to the nucleotide sequence represented by SEQ ID NO: 2 or 4; and

comprising a nucleotide sequence of a DNA which is amplifiable from a Gramineae plant with the primers represented by SEQ ID NO: 5 and 6 (primer 1 and primer 2).

The primers are sufficient to set forth a structural attribute in the nucleotide sequences recited in (b). In the amplification, the primers anneal to a nucleic acid member, which in turn describes a particular nucleotide sequence in the nucleic acid member. Such "a nucleotide sequence of a DNA which is amplifiable by polymerase chain reaction on a nucleic acid from a Gramineae plant with the primers represented by SEQ ID NO: 5 and 6 (primer 1 and primer 2)" is well conserved between two cDNA sequences described in the specification (SEQ ID NO: 1 and 3).

It is well known in the art that aminotransferases contain several conserved amino acid residues which are functionally or structurally important to provide aminotransferase activity [Mehta PK, et al., Eur. J. biochem., 186, 249-253 (1989) (copy attached)]. One of ordinary skill in the art would understand from the teachings in the specification that when a nucleic acid genus is taught to encode amino acid sequence having nicotianamine aminotransferase activity, the nucleic acid genus would at least encode such conserved amino acid residues. For

example, the nucleotide sequence represented by SEQ ID NO: 1 encodes amino acid residues Tyr-116, Pro-176, Asn-228, Pro-229, Gly-231, Asp-256, Tyr-259, Lys-289, Arg-297 and Arg-428, said amino acid residues each correspond to Y70, P138, N194, P195, G197, D222, Y225, K258, R266 and R386 which are described in the above article as being conserved among aminotransferases and having a functional or structural role.

When such attributes are coupled with the attribute of an ability to hybridize to a specific nucleotide sequence, one of ordinary skill in the art would understand that Applicants were in possession of the present invention recite in the Claims.

Accordingly, Applicants submit that the Examiner's rejection under 35 U.S.C. § 112, first paragraph based upon alleged lack of written description is moot. Reconsideration and withdrawal thereof are requested.

Enablement

The Examiner has rejected claims 2, 5-11, 13 and 21 under 35 U.S.C. § 112, first paragraph, asserting that the specification is enabling only for claims limited to a DNA encoding the nicotianamine aminotransferase of SEQ ID NO 1 and 2 (renamed SEQ ID NO 2 and 4 by the July 26, 1999 Amendment), vectors, transformed plant and bacterial cells, and transgenic plants comprising said DNA, as well as a method of enhancing iron absorbing ability of a plant with said DNA. Applicants

respectfully traverse this rejection.

A review of the present specification supports the assertion that the present subject matter is enabled. For instance, based upon the present disclosure and the knowledge of one of ordinary skill in the art, other sequences aside from SEQ ID NO 1 and 2 can be prepared without undue experimentation. For instance, at page 7, line 17 to page 8, line 10, a method is disclosed for the preparation of the protein of interest from the target plant. Next, at page 10, line 8 to page 11, line 8, there is disclosure of screening libraries to provide similar sequences. For instance, utilizing the proteins obtained using the method disclosed at page 7, line 17 to page 8, line 10, the sequence of the protein (whole or partial) can be determined and then utilized to design primers. Next, PCR can be conducted using a DNA template from the roots of plants including gramineae such as barley. The amplified DNA can then be used to screen the appropriate libraries.

Additionally, the present specification describes how to obtain potential nucleic acid or variants of the polynucleotide of SEQ ID NO: 1 or 3 that fall within the scope of the claims. The specification also provides an assay method that allows one of skill in the art to readily determine what nucleotide sequences will encode nicotianamine aminotransferases that are active. Further the specification describes the structural attributes discussed above that are common to the members of the

nucleic acid genus recited in, for example, (b) of claim 2 and that distinguish the nucleic acid genus. As described above, it is well known in the art that aminotransferases contain several conserved amino acid residues which are functionally or structurally important to provide aminotransferase activity [Mehta PK, et al., Eur. J. Biochem., 186, 249-253 (1989) (copy attached)]. One of skill in the art would be able to analyse a sequence other than SEQ ID NO: 1 or 3 as being useful within the scope of the present invention by determining said sequence encodes amino acid residues, such as Tyr-116, Pro-176, Asn-228, Pro-229, Gly-231, Asp-256, Tyr-259, Lys-289, Arg-297 and Arg-428 in SEQ ID NO: 2, said amino acid residues correspond to the amino acid residues which are known as being conserved and functionally or structurally important in aminotransferases.

Accordingly, Applicants submit that no undue experimentation is required to practice the full scope of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

In view of the above remarks, Applicants respectfully submit that the present claims define allowable subject matter. Accordingly, the Examiner is respectfully requested to withdraw all rejections and allow the currently pending claims.

If the Examiner has any questions concerning this application, he is requested to contact the Craig A. McRobbie (#42,874) at the offices of Birch, Stewart, Kolasch & Birch, LLP.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Mehta et al., Eur. J. Biochem., 186, 249-253 (1989)